COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
www.deq.virginia.gov

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

Robert G. Burnley
Director

(804) 698-4000
1-800-592-5482

AD HOC ADVISORY COMMITTEE MEETING SUMMARY
Lakes and Reservoirs Nutrient WQS
June 8, 2005

Welcome and Introductions

VA Department of Environmental Quality (DEQ): *Alan Pollock, Jean Gregory. Elleanore Daub, Alex Barron, David Whitehurst, Jennifer Palmore*

Advisory Committee Members Present:
VA Department of Game and Inland Fisheries (DGIF): *Bud LaRoche*
Dominion Power: *Frank Massie*
Ferrum College: *David Johnson*
North American Lake Management Society (NALMS), Virginia Lakes and Watershed Association (VLWA): *David Rosenthal*
Old Dominion University (ODU): *Harold Marshall*
Hampton Roads Planning District Commission (HRPDC*): William Johnston (City of VA Beach), Vernon Land (City of Norfolk)*
Lake Anna Association: *Dick Clark*
Piedmont Environmental Council/Virginia Conservation Network: *Gem Bingol*
Rivanna Water and Sewer Authority: *Robert Wichser*
Smith Mountain Lake Association: *Stan Smith*
Timmons Group: *Judy Ding*
VA Association of Municipal Wastewater Agencies (VAMWA): *Clifton Bell*
Va Tech/Academic Advisory Committee (AAC): *Carl Zipper*
VMA: *Tom Botkins*
VML: *Michael McEvoy*

Advisory Committee Members Unable to Attend:
VA Association of Counties (VACo): *Bonnie Johnson (Franklin County)*
VA Dept. of Conservation and Recreation*: Charles Lunsford*
VA Department of Health (VDH*)): Tom Gray (Office of Drinking Water)*

Chairman Alan Pollock reviewed the major issues facing the ad hoc committee: setting criteria appropriate for constructed impoundments and the two natural lakes in the Commonwealth, regulating nutrient levels in lakes and reservoirs when there are multiple uses (such as recreational fisheries, aquatic life, contact recreation, and public water supply) and varying levels of acceptability of nutrient concentrations among these uses, selecting the appropriate criteria (nitrogen may not be an appropriate candidate for these waters but other criteria under consideration are chlorophyll "a", total phosphorus, dissolved oxygen and secchi/water clarity), determining how to express these criteria (as median, maximum, or 90th percentile), and deciding whether any of the criteria should be narrative rather than numerical. Prior to the next (July 7) meeting, staff will e-mail to the committee a draft proposal. A fourth meeting is scheduled for August 9.

AAC Addendum to January 2005 Report and Discussion. Dr. Zipper summarized his investigation after the first meeting of the potential for alternate expressions of chlorophyll "a" criteria that are reflective of the conditions than can occur during high algal population episodes. The advisory committee had asked him to explore this because extreme (not median or average) conditions cause impairments and the criteria should reflect those conditions. He determined that the 90th percentile was a more appropriate metric than the maximum value for criteria expression because the maximum value is biased by the number of observations while no bias by number of observations is apparent with the 90th percentile. He considered three methods (regression, graphic, and scientific literature) for translating the criteria from median values to the alternative expression and decided to rely on the graphic approach. The results of this approach are summarized in the table below by ecoregion and fishery type which, as defined in the January AAC Report, include warmwater, coolwater (large multi-purpose lakes with top layer warm water fisheries and bottom layer cool water fisheries), managed or fertilized reservoirs and coldwater reservoirs (trout).

Potential candidate criteria for chl-a to protect fishery recreation and aquatic life, expressed as 90th percentiles of monthly values representative of the April-October period.

Fishery Type	*Warm-water*	*Coolwater*	*Coldwater (trout)*	*Managed/ Fertilized*
Eco-region		*----------chl-a (µg/L)----------*		
11	*35*	*25*	*10*	
9	*35*	*25*		**60*
14	*60*	*25*		

****Suggest VDGIF input, anticipating potential for non-VDGIF application.***

There were questions about 1) the appropriateness of placement of some of the waters in the fishery type categories (Dr. Ney based this on best professional judgment of VDGIF fishery biologists) and the possible need for refinements, 2) whether there were a sufficient number of lakes with data adequate to be expressed at the 90th percentile, 3)

the median or 90th percentile approach should be used, but not both, and 4) the impact of the sampling period (data were collected by DEQ from April through October for one year out of five). Dr. Zipper said that he found very little discussion in the literature on the optimal sampling strategy.

As was mentioned at the first meeting, there was concern that the criteria should not result in inappropriate classification of lakes as impaired, only to find during the TMDL process that the characteristics of the lake naturally caused it to have higher nutrient levels. For example, shallow impoundments such as Chickahominy Lake receive adequate light to promote heavy growths of attached macrophytes. The discussion focused on the need for DEQ to spend sufficient time developing the criteria to avoid unnecessary TMDLS and the discomfort impairment listings cause localities. Their citizenry often unfairly find fault with the local government because they do not understand that the source of the impairment is usually upstream and not under the control of the jurisdiction managing the reservoir. This is a serious concern and was brought up at the first meeting in the context that private citizens need to be educated that it takes time to implement water quality improvements, especially in localities such as Virginia Beach that have approximately 425 impoundments. Where a lake was just at the or above the criterion (such as 24 or 26 µg/L where the criterion was 25µg/L, it was suggested – instead of using a pass/fail approach – to provide a translator. Clifton Bell, representing, VAMA, distributed a potential reservoir survey questionnaire as a starting point for discussion of how numeric targets/translators could be combined with other information on lake use attainment during an assessment or de-listing step.

Discussion on which Impoundments to Include in Regulation.

Background: DEQ staff summarized the AAC recommendations made in the 2004 Report on the exclusion of waters from nutrient criteria in response to question #14 in Appendix J of the Commonwealth's Nutrient Criteria Development Plan:

- Exclude small water bodies if no detrimental effects on downstream water quality: stormwater management ponds, agricultural ponds, and small impoundments and watersheds under the control of a single owner (no public access).

- For larger lakes, physical classification schemes based on factors known to influence algal response to nutrient levels – such as mean retention time or flushing rate, and average depth – and original purpose (for all but the 2 natural lakes) are more important than size and public access.

- Noted that USEPA nutrient criteria documentation (2000) defined lakes as being water bodies greater than 10 acres in size and with mean retention times of 14 days or greater.

State examples: After the first meeting, Elleanore Daub contacted North Carolina for information on their chlorophyll "a" regulation for lakes and David Rosenthal contacted

the states of Minnesota and Illinois, among others, on how they classified lakes and reservoirs. North Carolina does not apply the chlorophyll "a" criterion to lakes and reservoirs less than 10 acres in surface area. Weiss and Kuenzler from the University of North Carolina undertook a study for the state on the tropic state of North Carolina lakes and found that a body of water with a mean depth of less than 20 feet would probably be of lower quality than one of greater mean depth. Minnesota includes in their definition of a lake a requirement of a maximum depth of greater than 15 feet; their definition of reservoir includes a hydraulic residence time of at least 14 days. Illinois applies their total phosphorus standards to lakes greater than 20 acres in size.

Discussion:

Exemption from the regulation of lakes under 10 acres in surface area would exclude many stormwater management/retention ponds which tend to be smaller than 10 acres. DCR staff responsible for developing their agency stormwater management regulations will attend the July meeting to serve as an information resource for the advisory committee.

It was pointed out that a reservoir with a mean residence time of less than 14 days exhibits more characteristics of a river than an impoundment and the waterbody should be regulated by nutrient criteria developed for streams and rivers rather than lakes and reservoirs.

The question was asked how many lakes would be excluded if lakes that do not have public access or have single ownership were exempted. DEQ does not have this type of information nor does it know the total number of lakes and reservoirs in the sate. It was suggested that the dam safety group at DCR could be approached as one source of information. DEQ has assigned David Whitehurst the task of trying to get a handle on the number of impoundments in Virginia, public or private ownership, and information such as surface area, depth, and residence time.

Public Water Supplies and Multi-Use Issues - Discussion by Localities.

Background: A DEQ staff preliminary review of lakes nutrient criteria in other states did not find separate criteria for public water supplies (PWS).

Discussion: State law says that PWS are the highest priority. There was considerable discussion about VDH Drinking Water Office regulations restricting gas powered motors and contact recreation in PWS. Some PWS do not allow fishing and that raised the issue whether the fishing use could be removed. DEQ staff responded that the Clean Water Act recognized fishing as a use in all waters and it would be difficult to get EPA to allow removal of a fishery use from lakes and reservoirs where fishing was prohibited because the goal is to have fish inhabit these waters. Algal treatment was discussed and how chlorophyll would not be an accurate indicator of nutrient enrichment in PWS where algicides were applied. In addition, an issue from the first meeting was mentioned: the uses in a reservoir vary based on location within the reservoir (e.g. headwaters of the reservoir may be more turbid and better suited to fishing than swimming while closer to

the dam may contain clearer, more aesthetically pleasing water where the swimming use should be protected.) Carl Zipper volunteered to do an analysis to see if the criteria developed by the AAC for fishery would also reflect protection for recreation uses or if contact recreation required mores stringent criteria than for aquatic life protection.

How to Address Dissolved Oxygen and Stratification Issues.

Background: Staff summarized the AAC Dissolved Oxygen Report: There is no specific EPA guidance on application of existing dissolved oxygen (DO) criteria to lakes and reservoirs. Therefore, states can interpret and apply the DO criteria for stratified water bodies as appropriate. VA DEQ applies existing DO criteria to the entire water column of lakes and reservoirs during stratified and unstratified conditions, resulting in a number of impoundments being classified impaired because of DO criteria violations.

The AAC report recommended that VA DEQ:

- Establish DO criteria for lakes and reservoirs based on designated uses
- Develop separate criteria for the epilimnion and hypolimnion based on designated uses to avoid unnecessarily stringent single DO criterion
- Develop separate DO criteria for natural lakes and constructed impoundments
- Continue current TMDL methodology until develop lake and reservoir criteria and after development of revised DO criteria, reservoirs that were previously classified as impaired may be reclassified as waters supporting one or more designated.
- Apply a single DO criterion that supports the water body's designated uses to all depths when the water column is completely mixed
- Ensure that the DO criteria for stratified reservoirs allows for at least one layer in the reservoir where temperature, DO & pH requirements are being met to support designated uses (see approach in OR & EPA criteria for the Chesapeake Bay).
- Consider not requiring hypolimnetic DO criteria for a given impoundment if the water utility can only withdraw water for treatment form the epilimnion.

The report also stated that if all reservoirs in VA are designated for aquatic life and/or water supply use, the DO criteria to support these uses would more than likely be adequate to support swimming & other recreational uses & separate DO criteria for these uses would not be necessary.

Discussion: The committee discussed the current TMDL TSI approach and provided examples where the current dissolved oxygen criterion has inappropriately caused an impoundment to be considered as impaired.

Follow-up for next time:

- The AAC recommended that separate criteria be developed for the two natural lakes in the State: Lake Drummond and Mountain Lake. At the next meeting Dr. Marshall will suggest appropriate criteria for Lake Drummond and DEQ staff will summarize Dr. Parker's recommendations for Mountain Lake.
- More discussion needed on criteria for multi-use fishing vs. water contact impoundments, including AAC analysis of applicability of fishery criteria to contact recreation uses.
- DEQ invite DCR to participate in additional discussion on whether to exclude storm water management ponds from the regulation and to learn about pending DCR regulations for these ponds;
- DEQ provide draft amendments for committee review and discussion.

Handouts distributed at the June meeting and/or by e-mail prior to the meeting:

From Ad Hoc Advisory Committee Members:

Clifton Bell, (VAMWA): Potential Survey Questions—Lake Use Attainment

Tom Bodkins (VMA): Nutrient Report Final FWQC, Nutrient report memo 040705, Nutrient Standards – App3, Nutrient Standards – App 4, Nutrient Standards – App 5

David Rosenthal (NALMS): Nutrient Criteria for Reservoirs Handouts distributed at the meeting and/or by e-mail prior to the meeting:

From DEQ:

Ad Hoc Advisory Committee meeting Summary. Lakes & Reservoirs Nutrient WQS. May 4, 2005.

NC DENR 2005 Response to VA DEQ Questions on NC Chlorophyll Standard Origin

Slide show on "Lake and Reservoir Nutrient Water Quality Standards Ad Hoc Advisory Committee meeting. June 8, 2005.

From Academic Advisory Committee:

AAC Lake Oxygen Report – Final by Little, Singleton and Bryant

Monitoring (Mountain Lake) by Bruce Parker, VA Tech

Recreational User Perceptions of Lake/Reservoir Water Quality:
A Literature Synthesis by Kurt Stephenson

Report of the Academic Advisory Committee to Virginia Department of Environmental Quality: Freshwater Nutrient Criteria. Addendum to January 2005 Report by Carl Zipper

Slide show by Carl Zipper on "Freshwater Nutrient Criteria for Virginia Lakes and Reservoirs: May 2005 addendum to AAC Report."

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